pany of man, for a chance gathering of these remains through the agency of water is precluded by the local topography of the place.

NEWS from M. Prshevalsky, forwarded on March 23 by telegraph from Vernyi, appears in the official paper, the *Russian Invalid*. On February 11 he had reached Lake Lob-Nor, *viâ* the Valley of the Lower Tarim. The population of the Valley is very sparse. Its height above the sea is somewhat more than 2,000 feet. Its flora and fauna very poor. The topography is quite different from that represented on the maps. He was, at the time of telegraphing, in the mountains Altyn-Tagh, some distance south of Lake Lob-Nor. The valleys of the exterior spurs of these mountains reach about 12,000 feet above the sea. Here, as well as in the lower regions there are wild camels. In the neighbourhood of Lob-Nor he found the ruins of two old towns. He was to spend February and March at Lob-Nor, April on the Lower Tarim, and May and June on the Tian-Shan, returning to Kuldja at the beginning of July.

WE have received as a contribution to the Gauss Fund, 1*l*. from Mr. G. Griffith.

THE additions to the Zoological Society's Gardens during the past week include an Egyptian Gazelle (*Gazella dorcas*) from Egypt, presented by Her Majesty the Queen; an Indian Leopard (*Felis pardus*) from India, presented by Dr. Sidney Smith; a Crested Porcupine (*Hystrix cristata*) from Ceylon, presented by Capt. Smerdon, s.s. *Orion*; a White Pelican (*Pelecanus onocrotalus*) from Egypt, presented by Mr. A. C. Henderson; a King Parrakeet (*Aprosmictus scapulatus*) from New South Wales, presented by Miss Jones; a Suricate (*Suricata zenik*) from South Africa, presented by Mr. J. Forbes Dixon; an Indian Cobra (*Naia tripudians*) from Ceylon, presented by the Hon. W. D. Wright; a Beisa Antelope (*Oryx beisa*), two African Sheep (*Ovis aries*), eight Vulturine Guinea Fowls (*Numida vulturina*), from East Africa, a Toque Monkey (*Macacus pileatus*) from Ceylon, deposited; a Pigmy Marmoset (*Hapale pygmæus*), two Bay-headed Parrots (*Caica leucogastra*), a Rough Terrapin (*Clemmys punctularia*) from the Upper Amazons, purchased.

SCIENTIFIC SERIALS

The American Journal of Science and Arts, April, 1877.—On the sensation of colour, by C. S. Peirce.—Note on the binocular phenomenon observed by Prof. Nipher, by J. Le Conte.—Revision of the genus Belemnocrinus, by C. Wachsmuth and F. Springer.—Thorpe's and Bunsen's methods for the estimation of nitrogen in nitrates, by S. W. Johnston.—Westfield during the Champlain period, by J. S. Diller.—New embryonic forms of trilobites, by S. W. Ford.—The winds of the globe, or the laws of atmospheric circulation over the surface of the earth, by J. H. Coffin.—On some nitro-derivatives of diphenylamide, by P. T. Austen.—On mineral analysis; on some fluorides; and on molecular volumes, by F. W. Clarke.—On the identity of the so-called Peganite of Arkansas with the Variscite of Breithaupt and Callamite of Damour, by A. H. Chester.—On a fibrous variety of sepiolite from Utah, by the same.—On Dr. Peale's notes on the age of the Rocky Mountains in Colorado, by J. J. Stevenson.

Poggendorff's Annalen der Physik und Chemie, No. 2, 1877.—The spectra of chemical compounds, by M. Moser.—Researches on the volume-composition of solid bodies, by M. Schröder.—Current regulator for gas, by M. Teclu.—Contribution to Boltzmann's theory of elastic reaction, by M. Kohlrausch.—Further communications on the connection between the viscosity and the galvanic conductivity of various liquids, by M. Grotrian.—On the theory of resonators, by M. Grinwis—On photography of the less refrangible parts of the solar spectrum, by M. Vogel.—Researches on the motions of radiating and irradiated bodies, by M. Zöllner.—New proof of the falsity of the emission theory of light, by E. Feussner.—On double excitation of the ebonite electrophorus, by M. Schlösser.

Beiblätter zu den Annalen.—Quantitative comparison between friction and galvanic electricity in respect of tension, by M. Nystrom.—On the deduction of a new electrodynamic fundamental law, by M. Clausius.—Thermoelectric researches, by M. Tidblom.

THE *Naturforscher* (March).—From this part we note the following papers:—On the functions of the larger brain (cerebrum), by Herr Goltz.—On the expansion of growing vegetable cells through the tension existing between the contents of the cells and the membrane forming them, by Hugo de Vries.—On the spectrum of the new star in Cygnus, by R. Copeland.—On the atomicity of phosphorus, by Ira Remsen.—On the high tides in the River Elbe, by K. R. Bornemann.—On the reproduction of eels, by M. C. Dareste.—On the formation of hail, by H. Fritz.—On the inhalation of air by the roots of plants, by MM. P. P. Déhérain and J. Vesque.—On electrolysis accompanied by the development of hydrogen at both electrodes, by Emil Elsaesser.—On the daily and yearly course of magnetic declination, by J. Hann.—On the behaviour of leaves in an atmosphere free from carbonic acid, by B. Corenwinder.—On the companions of the pole star, by A. de Boe and others.—On the spreading of drops of liquids, by Fillipo Centolesi.—On the preparation of photographic plates in daylight, by Oswald Lohse.—On the origin of the flying power of bees, by Herr Dönhoff.—On the chlorophyll of Coniferæ germinating in the dark, by R. Sachsse.—On the behaviour of chlorophyll in the vine, by G. Briosi.—On the glycogen contained in muscles, by Th. Chandelon.

Journal de Physique, March.—On the dynamical theory of gases, by M. Violle.—On the effects of a jet of air sent into water, by M. de Romilly.—On the suspension and ebullition of water on a large-meshed tissue, by the same.—On the phenomenon of the black drop and its influence on observation of the transit of Venus, by M. André.—The persistence of impressions on the retina, various experiments with the projection-phenakisticope, by M. Gariel.—On Optography, by M. Kühne.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. x., fasc. iii.—On two recent works (on flagellation and the anatomical museum at Pavia) presented to the Institution, by M. Verga—On some rare alterations of the first formation of the uterus and its attachments; on a cause not yet confirmed of distonia, by M. Sangalli.—On a new defence of the theory of Melloni on electrostatic induction, by M. Cantoni.—On the divisibility of comets into minute parts, and on a dark spot found in the Milky Way, by P. Secchi.

Revue des Sciences Naturelles, tome v. No. 4.—On the so-called cladodes of Ruscus, by M. Duval-Jouve.—Study of a chromogenic bacterium in the water of steeping of flax (*Bacterium rubescens*, Ray Lankester [?]), by Prof. Giard.—On the development of the Anguillula Aceti, Ehrb., by M. Hallez.—Economical Aquarium, by M. Sabatier.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 22.—"On Stratified Discharges *v.* Stratified and Unstratified Forms of the Jar-Discharge," by William Spottiswoode, M.A., F.R.S. It is well known that if a Leyden jar be discharged through a vacuum tube, the discharge generally takes the form of an unbroken column of light, extending from the point of the positive terminal to the hilt of the negative, *i.e.*, to the extreme negative end of the tube; and that it shows no trace of either negative glow or intervening dark space. On the other hand, I have found, by experiments with a large Leyden battery, that if a tube having one terminal connected with the negatively charged coating of the battery and the other held beyond striking distance from the positively charged coating, the discharge in the tube will show a separation of the positive from the negative part by a dark intervening space. Under suitable circumstances of exhaustion it will also show striæ, in the same manner as when the discharge is effected directly with a Holtz machine, having the conductors either closed or open beyond striking distance (see Roy. Soc. *Proceedings*, vol. xxiii. p. 460). Again, I have found, with the same battery, that if the tube be connected—otherwise as before—and held at a distance less than at first, but a little greater than striking distance, a stratified discharge much more brilliant and more like that produced by a coil will be exhibited. The latter form of discharge appears to the unassisted eye as an unbroken column of light, but with a negative glow and dark space. A revolving mirror, however, resolves the column into a regular array of striæ, having a rapid proper motion towards the positive terminal.

With a view to examining the transition from the stratified to the unstratified form as closely as possible, a Holtz machine was employed, with a battery of one or more jars. The outside of this battery and one terminal of the tube were connected with the earth; and the inside and the other terminal were alternately connected with the positive conductor of the machine, so that the battery was alternately charged and discharged through the tube. The amount of charge was regulated partly by the distance through which the conductors of the machine were separated, and partly by the number of revolutions of the machine during which the charging took place.

The first object proposed was to ascertain whether a jar could be charged with so small a quantity of electricity as of itself to give a stratified discharge in a tube.

A number of tubes tried with various amounts of battery charge, but with the same surface, showed that, as the charge was increased, the head of the positive column advanced towards the negative terminal, the dark space became narrower, and the glow contracted in dimensions; and when the head of the column drew very near to the negative terminal, the glow, instead of covering the whole surface of the terminal, formed a small drop at the point. On still further increasing the charge, the drop withdrew to the hilt of the terminal; and finally, when it had completely retreated into the hilt, the continuous or true jar-discharge took place.

With a view to testing experimentally how far the effects here described were due to quantity, and how far to tension, the size of the jar was altered, all other circumstances remaining the same. It was then found that the maximum charge compatible with stratification was greater with a large than with a small jar.

As a further experiment in this direction, a series of jars were arranged in cascade, and it was found that the greater the number of jars so arranged the smaller the charge necessary to ensure a true jar-discharge. A charge insufficient to destroy stratification with one jar was sufficient to destroy them when more than one was used in cascade. These results point to tension rather than to quantity as the determining cause of the character of the discharge.

The duration of the stratified discharges observed throughout these experiments was exceedingly short, indistinguishable, in fact, from that of the true jar-discharge. When viewed in a revolving mirror they showed no sign whatever of prolonged duration, and we may thence conclude that, so far as our present instrumental arrangements extend, there is no inferior limit to the duration of discharge necessary for the production of striæ.

A comparison of the results here obtained with those detailed in Part ii. of these researches, shows that the phenomena produced by suitable disposition of the Leyden battery coincide with those produced by the induction-coil. With the coil it was found that (1) for a given electromotive force the column of striæ was shorter the larger the battery surface or strength of current used; (2) that the proper motion, when directed as usual towards the positive terminal, was more rapid the greater the electromotive force employed. With the Leyden battery it was found that (1) in order to maintain the same length of column with an increased surface the charge must be increased in a larger proportion than the surface; and (2) it was noticed that the striæ which when the tension was low were distinct and well separated, became more blurred as the tension rose, until they sometimes were blended into an apparently unbroken column of light. The presence, however, of the negative glow still showed that the true jar-discharge had not yet been reached.

Geological Society, April 11.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—John Robert Campbell, James Carter, William Radcliffe Ellis, William Hamilton Merritt, William Morgans, and Edmund Albert Parsick, were elected fellows of the society. The following communications were read:—On sandworn stones from New Zealand, by John D. Enys, F.G.S. The author exhibited specimens of sandworn pebbles from near Wellington, in New Zealand, and described their mode of occurrence.—The Bone-caves of Cresswell Crags, third paper, by the Rev. J. Magens Mello, F.G.S. In this paper the author gave an account of the continued exploration of these caves, and of the completion of the examination of the Robin Hood Cave, noticed in his previous communications. Five deposits could be distinguished in the Robin Hood Cave, namely, when all present:—1. Stalagmite, 2 feet. 2. Breccia, with bones and flint implements, 1 foot 6 inches. 3. Cave-earth, with bones and implements, 1 foot 9 inches. 4. Mottled bed, with bones and implements, 2 feet. 5. Red sand, with bones and quartzite implements, 3 feet. The most important discoveries were made in the cave-earth, and chief among these was a fragment of bone, having on it a well-executed outline of the head and neck of a horse, the first recorded discovery of any such work of art in this country. As the result of the exploration of these caverns, the author said it is evident that during the Pleistocene period, Derbyshire and the adjoining counties were inhabited by a very numerous and diversified fauna, the vast forests and pastures which extended far to the east and south offering a congenial home to the mammoth, the woolly rhinoceros, the hippopotamus, the Irish elk, the reindeer, the bison, and the horse, whilst among them the hyæna, the glutton, the bear, the lion, the wolf, the fox, and the great sabre-toothed *Machairodus*, roamed in search of prey; and that with these and other animals man lived and waged a more or less precarious struggle, amidst the vicissitudes of a varying climate, sheltering himself in the numerous caves of the district, which were already the haunts of the hyæna and its companions.—On the mammal-fauna of the Caves of Creswell Crags, by Prof. W. Boyd Dawkins, F.R.S. In this paper the author gave an account of the remains found in the caves explored by the Rev. J. M. Mello. He stated that the recent explorations had proved that the Robin Hood Cave was inhabited by hyænas, not only during the deposition of the cave-earth and breccia, but also during that of the red-sand clay underlying it, which had also furnished traces of the existence of man. After noticing the conditions of the fossil bones found in the caves, the author proceeded to remark upon the general results of the explorations with regard to their Pleistocene fauna, and concluded that there is no evidence from these or other caves in this country to prove that their faunas are either pre- or inter-glacial, and that we have no proof of the existence of pre- or inter-glacial man in Britain.

Zoological Society, April 17.—Mr. Osbert Salvin, F.R.S., in the chair.—The secretary exhibited and made remarks on some young Anacondas which had been produced dead by the large female Anaconda purchased on February 15.—The secretary exhibited some photographs of the young gorilla, now living in the Berlin Aquarium, and made some remarks on what, it now seemed certain, was an example of this ape, which was formerly living in one of Wombwell's travelling menageries, and was after its death transferred to the late Mr. C. Waterton's collection.—A letter was read from Mr. W. A. Willes, in which he gave an account of the success which had attended the endeavours of the Acclimatisation Society at Christchurch to introduce salmon into New Zealand from the United States.—A communication was read from Mr. W. A. Forbes, F.Z.S., containing a description of the peculiar organ known as the *Bursa Fabricii* in birds, and of its variations and modifications in the different genera of the class which he had had an opportunity of examining.—A communication was read from M. L. Taczanowski, in which he gave a list of the birds collected in North-Western Peru in 1876 by Messrs. Jelski and Holzmann. Amongst several new and interesting forms described was a new genus and species of Fringillidæ proposed to be called *Gnathospiza raimondii*.—A communication was read from the Rev. R. Boog Watson, containing some notes on the Madeiran Mollusc identified by the Rev. R. T. Lowe as *Achatina folliculus*.—A communication was read from Mr. E. P. Ramsay containing the concluding portion of his list of birds met with in North-Eastern Queensland, chiefly at Rockingham Bay.—A communication was read from Dr. Otto Finsch, containing a preliminary account of the birds collected during his recent journey in the North-Eastern part of Turkestan.—A communication was read from Prof. Owen, containing the description of a new species of extinct kangaroo of the genus *Sthenurus*, which he proposed to call *Sth. minor*, together with some remarks on the relation of this genus to *Dorcopsis*.—Mr. Edgar A. Smith read a paper containing descriptions of new species of South-American *Helicidæ* in the British Museum.—The Marquis of Tweeddale, F.R.S., gave descriptions of four new species of birds from the Indian region. These he proposed to name as follows:—*Trichostoma leucoprocta*, *Chrysococcyx limborgi*, and *Pomatorhinus austeni* (from Tenasserim), and *Brachypteryx buxtoni* (from Sumatra).—Mr. Osbert Salvin exhibited and pointed out the character of a new genus and species of bird of the family Ampelidæ, from Costa Rica, and proposed to call it *Phainoptila melanoxantha*.

Meteorological Society, April 18.—Rev. T. A. Preston, M.A., in the chair.—W. Morris Beaufort and Arthur A. Pearson were elected fellows of the Society.—The following papers were read:—On the meteorology of Mozufferpore, Tirhoot, for 1876, by C. N. Pearson, F.M.S. This year partook of the abnormal character of its predecessor, but in a different degree, and with widely different results. The total fall of rain was 57·69 inches, of which no less than 43·34 inches were registered in August, September, and October.—On the Diéthéroscope, by Prof. J. Luvini, of Turin. This is a new instrument contrived by the author for observing the changes of atmospheric refraction optically.—Improved form of thermometer for observing earth temperature, by G. J. Symons, F.M.S. This apparatus consists of an iron pipe driven in the ground to the required depth, and a small but very strong thermometer, the bulb of which is so protected that no change of indication occurs when the thermometer is drawn out of the tube for reading. The pipe is closed at the bottom by welding, and the point hardened so as to penetrate the soil with ease. For depths of 3 feet and under the thermometer is inserted in a light rod, but for all greater depths it is mounted in a short weighted stick attached to a strong chain.—Note on the degree of accordance of Mr. Glaisher's and the Kew thermometer standards, by William Ellis, F.R.A.S. This paper gives an account of the comparison of eight thermometers at the Royal Observatory which had been previously compared with Mr. Glaisher's and the Kew standard thermometers, and the result shows that the two standards are practically identical.

Entomological Society, April 4.—Prof. Westwood, president, in the chair.—Messrs. G. Harding, C. A. Briggs, and J. T. Carrington were elected ordinary members, and Messrs. E. H. Birchall, T. D. Gibson-Carmichael, and V. Cluse were elected subscribers.—The Secretary exhibited a collection of fine species of Lepidoptera from a place about twenty miles from Bangkok in Siam, forwarded to him by Mr. R. Garner, F.L.S., of Stoke-upon-Trent.—Mr. McLachlan exhibited a specimen of *Ophideres materna*, a brightly-coloured exotic species of *Noctuidæ*, given to him by Mr. R. H. Scott, of the Meteorological Office, with a note to the effect that it was taken at sea in lat. 25° 24′ S., long. 62° 10′ E. (the nearest land being the island of Mauritius, about 360 miles distant), by Capt. Raeburn, of the ship *Airlie*. The moth is a common Indian species, but is found also in Africa. A specimen was long ago received from Brazil, and Mr. Grote had recently noticed its occurrence in Florida. He also exhibited a cocoon and pupa of a species of *Cetoniidæ* (probably *Diplognathus silaceus*), from Cameroons, sent to Mr. Rutherford. The cocoon appeared to be formed of dark brown earth, but attached thickly to the exterior were oval, slightly flattened, deep black, hard bodies (each nearly five lines long by two broad), which he thought were probably the excrement of some rodent animal. Mr. Champion exhibited *Stenus kiesenwetteri* (hitherto only found in this country at Wimbledon), *Gymnusa brevicollis*, *Bembidium nigricorne*, and *Plociomerus luridus*, all from Chobham; also *Philonthus cicatricosus*, from Shoreham.—Mr. Howard Vaughan exhibited (on behalf of Mr. Bidwell) a specimen of *Notodonta trilophus*, taken about the year 1867 by a lamplighter at Ipswich, who had it alive with several specimens of *N. ziczac*. It was only the second (authentic) capture of the insect, the first having been found at Saint Osyth, Essex, by Mr. Douglas.—The President read a letter he had received from Mr. B. G. Cole respecting the subject of Season-Dimorphism in Lepidoptera. He observed that from a number of eggs laid by *Ephyra punctaria*, those that emerged in July were of the spotted variety, while those which remained in the pupa state till the following May, in all respects resembled the mother. Mr. Cole referred to some remarks by Dr. Knaggs, published in the Entomologists' *Monthly Magazine* (vol. iii. p. 238) as bearing on the same subject. He considered it probable that the insects that were produced by a slow process of development would produce the May form (which might be considered the type), whilst those whose development was hastened by the heat and light of summer would produce smaller and less perfect insects. Mr. McLachlan alluded incidentally to the Lepidoptera brought home by the Arctic Expedition from the far north (82° N.), and said that the larvæ of most of those species, must, of necessity, require more than one season to acquire their full growth; for the short and fitful summer was utterly inadequate for the full development in one season of most of the species, and furthermore, it was probable that the pupa state might habitually last several years.—The President read notes upon a strepsipterous insect, parasitic on an exotic species of Homoptera, (*Epora subtilis*, Wlk.), from Sarawak, accompanied by drawings illustrating the metamorphosis. He also read notes on the genus *Prosopistoma*, especially with regard to the species from Madagascar described by Latreille, of which he exhibited the types.—Mr. Cameron communicated a paper on East Indian *Tenthredinidæ*, and Mr. Butler a paper on the Lepidoptera of the Amazon Valley, collected by Dr. Trail in the years 1873–75.—Mr. Baly communicated descriptions of new species of *Halticidæ* and Mr. C. O. Waterhouse a monograph of the Australian species of the Coleopterous family *Lycidæ*.—Mr. F. Smith read descriptions of new species of the genera *Pseudomyrma* and *Tetraponera*, belonging to the family *Myrmicidæ*.

Institution of Civil Engineers, April 24.—Mr. George Robert Stephenson, president, in the chair.—The first paper read was on a deep boring for coal at Scarle, Lincolnshire, by Prof. Edward Hull, F.R.S. This boring was commenced about four years ago by a local company, to test the presence of coal in the neighbourhood of Lincoln—Mr. J. T. Boot, of Mansfield, being the engineer—and had been carried out by the Diamond Rock Boring Company. The total depth attained was 2,030 feet; but as this depth was insufficient for the object in view, it was desirable that the bore-hole should be carried further down. The following formations, with their approximate thicknesses, had been passed through:—

	Depths. Feet.			Thickness. Feet.
Alluvial Strata	1	to	10 ...	10
Lower Lias Clay and Limestone	10	,,	75 ...	65
Rhœtic Beds	75	,,	141 ...	66
New Red Marl and Sandstone	141	,,	1,500 ...	1,359
Permian Beds	1,500	,,	1,900 ...	400
Carboniferous Strata	1,900	,,	2,030 ...	130

Although the carboniferous strata had been reached, the cores brought up were of so peculiar a character as to leave it uncertain to what portion of the carboniferous formation they belonged; and, as the question of the eastward extension of the Yorkshire coal-field was one on which a boring at this spot was calculated to throw much light, it was important, both in an economic and in a scientific point of view, that it should be continued until something definite had been determined.—The second paper read was on street tramways, by Mr. Robinson Souttar.

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